which is now being carried out at the polytechnic, at a cost of 12,000*l*., toward which the late chairman of the governing body, Mr. Edric Bayley, has generously contributed the sum of 5000*l*., the remainder being made up by a grant from the London County Council. Mr. C. T. Millis, the principal, in his report, stated that there were nearly 3000 individual students in attendance during the past session, of whom 330 were day students.

WE have received the calendar of the Camborne Mining School, Camborne, for 1907–8. This school, now in the twentieth year of its existence, has rapidly expanded, and has proved very successful in giving facilities to students for acquiring a thorough knowledge of metalliferous mining. The success has been largely due to the organisation of a systematic course of practical mining, the South Condurrow, now known as the King Edward mine, having been purchased for the purpose in 1897. Students there obtain an acquaintance with practical mining, ore dressing, and engine testing, as well as practice in mine surveying under the supervision of practical men under the direct

its present stage. The work at South Kensington, as is well known, is largely due to his instigation and interest, and the new Technological Institute which will begin in the coming year will be a natural outcome of that work. By means of it we hope to be brought more into line with other nations."

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, November 7.—"The Diurnal Variation of Terrestrial Magnetism." By Prof. Arthur **Schuster**, F.R.S.

In a previous communication (Phil. Trans., vol. clxxx., p. 467, 1889) the author proved that the diurnal variation of terrestrial magnetism had its origin outside the earth's surface, and drew the natural conclusion that it was caused by electric currents circulating in the upper regions of the atmosphere. If we endeavour to carry the investigation a step further, and consider the probable origin of these
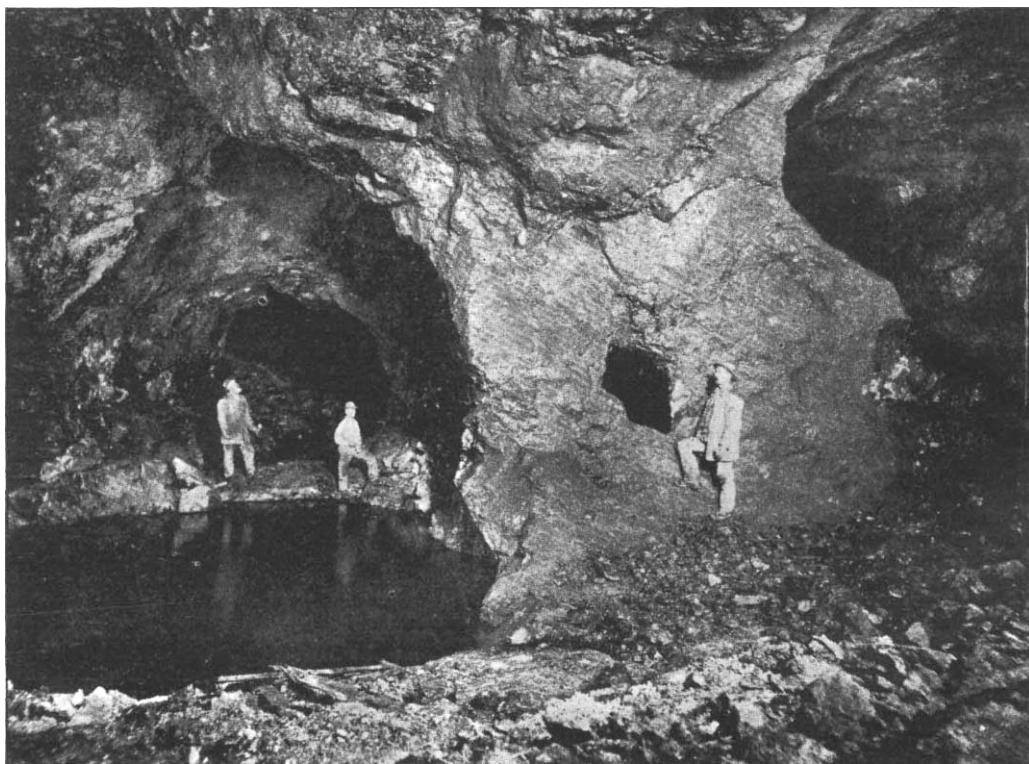
View underground in King Edward Mine.

authority of the school. Moreover, in consequence of the situation of the school in the centre of the chief mining district of Cornwall, students have the privilege of visiting the mines. The calendar is illustrated by a number of admirable photographic views, many of which have been taken by Mr. J. C. Burrow, the leading exponent of underground photography. The photograph here reproduced represents the so-called " cathedral " at the 460-feet level of King Edward mine.

MR. HALDANE, M.P., unveiled a statue of the King at University College School, Frognal, Hampstead, on Saturday, December 14. The statue has been erected in a niche above the main entrance, and is presented to the school by the architect, Mr. Arnold Mitchell, in commemoration of the opening of the school by the King on July 25. In a subsequent address Mr. Haldane said :— " There is no subject of greater general importance than education, and if Prince Albert had lived there is no doubt that education would have been ten years in advance of

currents, we have at present no alternative to the theory, first proposed by Balfour Stewart, that the necessary electromotive forces are supplied by the permanent forces of terrestrial magnetism acting on the bodily motion of masses of conducting air which cut through its lines of force. In the language of modern electrodynamics, the periodic magnetic disturbance is due to Foucault currents induced in an oscillating atmosphere by the vertical magnetic force. The problem to be solved in the first instance is the specification of the internal motion of a conducting shell of air, which shall, under the action of given magnetic forces, determine the electric currents producing known electromagnetic effects. Treating the diurnal and semi-diurnal variations separately, the calculation leads to the interesting results that each of them is caused by an oscillation of the atmosphere which is of the same nature as that which causes the diurnal changes of barometric pressure.

The mathematical analysis is simple so long as we take the electric conductivity of the air to be uniform and constant ; but the great ionisation which the theory demands

requires some explanation, and solar radiation suggests itself as a possible cause. Hence we might expect an increased conducting power in summer and in day-time as compared with that found during winter and at night. Observation shows, indeed, that the amplitude of the magnetic variation is considerably greater in summer than in winter, and we know that the needle is at comparative rest during the night. The variable conducting power depending on the position of the sun helps us also to overcome a difficulty which at first sight would appear to exclude the possibility of any close connection between the barometric and magnetic variations; the difficulty is presented by the fact that the change in atmospheric pressure is mainly semi-diurnal, while the greater portion of the magnetic change is diurnal. This may, to some extent, be explained by the mathematical calculation, which shows that the flow of air giving a twenty-four-hourly variation of barometric pressure is more effective in causing a magnetic variation than the corresponding twelve-hourly variation, but the whole difference cannot be accounted for in this manner. If, however, the conductivity of air is greater during the day than during the night, it may be proved that the twelve-hourly variation of the barometer produces an appreciable periodicity of twenty-four hours in the magnetic change, while there is no sensible increase in the twelve-hourly magnetic change due to the twenty-four-hourly period of the barometer.

A good test of the proposed theory may be found in a closer examination of the diurnal magnetic changes in the equatorial regions, because, owing to the inclination of the magnetic to the geographical axis, the magnetic changes ought to have a term which does not depend on local time, but on the time of the meridian containing the geographical and magnetic pole. This term has its greatest importance at the equator and at the time of the equinox.

The value of the conductivity necessary to explain the diurnal variation in the manner indicated depends on the thickness of the layers which carry the currents. If e be the thickness and ρ the conductivity, and the amplitude of oscillation in the upper layers is assumed to be the same as that deduced from the barometric variation, it is found that $\rho e = 3 \times 10^{-6}$. If e is equal to 300 kilometres, the conductivity would have to be as high as 10^{-13}, while the observed conductivity of air at the surface of the earth under normal conditions is of the order 10^{-24}, at a height at which the pressure is reduced to one degree per square centimetre, the conductivity would be 10^{-18}, assuming the rate of re-combination to be independent of temperature and the ionising power to be the same. The conclusion is that there must be a powerful ionising agent in the upper layer of the atmosphere.

November 21.—"The Silver Voltameter." Part I. "On a Comparison of many Forms of Silver Voltameters." By F. E. **Smith**; and "A Determination of the Electrochemical Equivalent of Silver." By F. E. **Smith** and T. **Mather**, F.R.S.

Part II. "The Chemistry of the Silver Voltameter." By F. E. **Smith** and Dr. T. M. **Lowry.** Communicated by Dr. R. T. Glazebrook, F.R.S.

Part I.—Very large voltameters were experimented with. Four of the kathode bowls had a capacity of 500 c.c. each, and in general from 300 c.c. to 400 c.c. of electrolyte were employed. The anodes were coated with electrolytic silver. With a Rayleigh form of voltameter containing an electrolyte of pure silver nitrate, the mean of fifty-two determinations of the electrochemical equivalent of silver was 1·11827 milligrams per coulomb, the current being indirectly measured by the Ayrton-Jones balance. With a Richards's form of voltameter, in which the pot had previously been baked in an electric furnace, the value 1·11828 was obtained, and with a syphon and other modified forms of voltameter the value 1·11827 resulted, pointing to little or no irregularities in the large-size Rayleigh form of voltameter. Deposits were made when the voltameter was subject to a gaseous pressure of 2·4 cm. of mercury, and were found to be identical with those made at atmospheric pressure. The temperature coefficient is probably *nil*, and is not greater than 1 part in 1,000,000 per 1° C. The range in the current intensities was from 0·5 ampere to 8 amperes.

Part II.—Before a definite value could be assigned to the electrochemical equivalent of silver it was necessary to demonstrate that silver nitrate solutions, giving constant products, could be obtained. This was done by preparing silver nitrate from electrolytic silver, from much used silver nitrate, and from commercial samples of the salt. Attempts to confirm the observations of Novak, Rodger and Watson, Kahle, van Dijk, and others, on the effect of repeated electrolysis of a solution, show that in the form of voltameters described in Part I. there is no increase in the deposit with continued use of a solution which is comparable with that obtained by the observers mentioned. High values for the electrochemical equivalent are obtained if the solution contains oxide, carbonate, chloride, nitrite, or hyponitrite; low values are caused by acid. Silver chlorate and silver perchlorate appear to give normal deposits, but are more troublesome in use, and have no advantage over the nitrate.

"On the Normal Weston Cadmium Cell." By F. E. **Smith.** Communicated by Dr. R. T. Glazebrook, F.R.S.

In the past many investigators have pointed out that the depolariser may produce variations in the E.M.F. so great as 0·002 volt. A mode of manufacture of mercurous sulphate was first sought which could be relied on to give a constant product. The salt was prepared in four ways :— (1) electrolytically; (2) by chemical precipitation; (3) by re-crystallisation from a solution in strong sulphuric acid; (4) by the action of fuming sulphuric acid on mercury. The mean E.M.F. of the cells set up with the electrolytic salt is 1·01828 volts; with No. 2 product, 1·01830 volts; (3) gives 1·01832 volts, and (4) 1·01831 volts. The effect of the size of the crystals of the depolariser, to the importance of which attention has been directed by H. v. Steinwehr, was investigated by using crystals varying in size from 5 to 30 microns, and it is concluded that no large crystals which are sufficiently soluble to act as an efficient depolariser can give an E.M.F. appreciably lower than that due to crystals from 5 to 30 microns long. The recuperative power of the cell was tested by short-circuiting for from one minute to five days. The temperature coefficient for the range 10° C. to 30° is given by

$$E_t = E_{17} - 3\cdot4_5 \times 10^{-5}(t - 17) - 0\cdot066 \times 10^{-5}(t - 17)^2.$$

Geological Society, November 20.—Sir Archibald Geikie, K.C.B., Sec.R.S., president, in the chair.—Glacial beds of Cambrian age in South Australia : Rev. Walter **Howchin.** The known extension of these beds is 460 miles from north to south. The greatest width across the strata is about 250 miles. The beds form part of a conformable series, with Cambrian fossils in the upper part. The rocks above the glacial beds are purple slates and limestones; below they are quartzites, clay-slates, and phyllites, passing into basal grits and conglomerates, resting on a pre-Cambrian complex. The beds consist of a ground mass of unstratified indurated mudstone, carrying boulders up to 11 feet in diameter. The thickness of the glacial series has been proved up to 1500 feet. The commonest rock-type among the boulders is a close-grained quartzite. The discovery of ice-scratched boulders has indicated the origin of the beds. The striæ are often as distinct as those in a Pleistocene Boulder-clay. Eighty definitely glaciated boulders have been secured, and other erratics too large for removal noted. Under pressure and movement in their bed some boulders exhibit abrasion, but this produces features not to be confounded with glaciation. In the movement due to pressure, which induced cleavage, some stones have become distorted, and many show pseudo-striation on exposed surfaces. The lines, however, are of equal size and depth, and parallel to each other over wide surfaces, while the glacial striæ are patchy in their occurrence, of varying intensity, and divergent in direction. Mr. H. P. Woodward's suggestion, that the "Boulder-clay" had its origin from "floating ice," is considered most in accordance with facts.—A formation known as "glacial beds of Cambrian age" in South Australia : H. **Basedow** and J. D. **Iliffe.** Eight miles south of Adelaide an exposure of the conglomerate is bounded to the east by alternating quartzitic and argillaceous bands of rock, comprising the central and western portions of a fan-fold, partly cut off by a fault. Further evidence of stress in this margin is given. On

the west side the conglomerate is bounded by the " Tapley's Hill Clay-slates," and there is evidence that the conglomerate is isoclinally folded. In that portion of the conglomerate adjacent to its confines, " boulders " of quartzite are apparently disrupted portions of quartzite-bands, since these are in alignment with the truncated portions of bands still existing, and are of similar composition. The presence in the conglomerate of boulders of rocks foreign to the beds that border the conglomerate is not yet accounted for.

Entomological Society, November 20.—Mr. G. H. Verrall, vice-president, in the chair.—*Exhibits.*—W. **West**: Examples of *Tropideres sepicola*, F., taken in the New Forest near Matley Bog, July 7, 1904; *Oxylaemus variolosus*, Dufs., from Darenth Wood, March 2, 1903; and *Apion annulipes*, Wenck, from Darenth Wood, August 27, 1905. —H. J. **Turner**: Two cases to show the complete life-histories of *Coleophora onosmella* and *C. bicolorella.*— Dr. F. A. **Dixey**: Several species of five African genera of Pierine butterflies for the purpose of showing the strong mimetic parallelism that existed between them.—W. **Gardner**: A remarkably small specimen of *Meloë pro-scarabaeus*, with an example of the normal size.—W. G. **Sheldon**: A case containing many examples of *Araschnia levana*, var. *prorsa*, and intermediates, bred from larvæ found in the department of the Aisne, France, in June last. —Dr. T. A. **Chapman**: Specimens of *Araschnia levana*, type, bred 1907, to give a fuller view of this form in assistance to Mr. Sheldon's report.—Mr. **Sheldon** also showed strings of the ova *in situ* on nettle, these being base to apex, and in position resembling those of *Polygonia c-album.*—G. **Arrow**: A specimen of a handsome exotic cockroach (*Dorylaea rhombifolia*) found alive in the Natural History Museum, one of an apterous species inhabiting China, India, Madagascar, South Africa, &c.—Dr. G. B. **Longstaff**: A case containing thirty-five Ithomiine butterflies of eleven species, belonging to six genera, taken at Caraccas, Venezuela, some 3600 feet above sea-level, and affording a striking exception to Darwin's principle that closely allied forms are not usually found together.—Lieut.-Colonel N. **Manders**: A collection of some 200 specimens of tropical butterflies belonging to the genera Melanitis, Mycalesis, Attella, Papilio, and Catopsilia, which had been subjected to abnormal degrees of temperature, mostly in the pupal stage. The object of the experiments was to ascertain the effect of climate on the colours of tropical butterflies.—W. J. **Kaye**: A convergent group of Heliconine butterflies, from the Potaro Road, Potaro River, British Guiana.—*Papers.*—Mimicry in North American butterflies of the genus Limenitis (Basilarchia): Prof. E. B. **Poulton.**—The life-history of *Lomecosus strumosa*, F.: H. St. J. **Donisthorpe.**

Chemical Society, December 5.—Sir William Ramsay, K.C.B., F.R.S., president, in the chair.—The affinity constants of bases determined by the agency of methyl orange. Preliminary note: V. H. **Veley.** The author has applied his tintometric method to the determination of the degree of hydrolysis of hydrochlorides of a large number of organic bases ranging in type from hydroxylamine to cinchonidine. Several results are found to be in accordance with the expression of Arrhenius, $k_b/k_w = (1 - x)v/x^2$, whilst in the case of bases of analogous composition the ratio of the hydrolysis values found is nearly equal to the ratio of the heats of neutralisation with hydrochloric acid. —The constituents of essential oil of nutmeg: F. B. **Power** and A. H. **Salway.** Ceylon nutmeg oil contains eugenol, *iso*eugenol, *d*-pinene, *d*-camphene, dipentene, *d*-linalool, *d*-borneol, *i*-terpineol, geraniol, a new alcohol yielding on oxidation a diketone, a citral-like aldehyde, safrole, myristicin, myristic acid (free and in the form of esters), formic, acetic, butyric, and octoic acids, and a new monocarboxylic acid, $C_{13}H_{16}O_3$, all in the form of esters.—The resolution of *sec*-octyl alcohol: R. H. **Pickard** and J. **Kenyon.** *d-sec*-Octyl hydrogen phthalate is obtained by fractional crystallisation of the brucine salt from acetone and the *l*-salt by fractional crystallisation of the cinchonidine salt from aqueous acetone.—The velocity of reduction of the oxides of lead, cadmium, and bismuth by carbon monoxide, and the existence of the suboxides of these metals: F. J. **Brislee.** The results of the experi-

ments confirm Tanatar's statement that the suboxides are definite chemical compounds, but do not prove their stability.—The relation between unsaturation and optical activity, part i., the menthyl and bornyl esters of β-phenyl-propionic, cinnamic, and phenylpropiolic acids: T. P. **Hilditch.** The boiling points and specific gravities increase with increase of unsaturation, but the refractive indices rise with the change to an ethylenic linking, but fall to an intermediate value for the further change to an acetylenic linking. Walden's view that increase of saturation is accompanied by increase of optical rotation is confirmed so far as the change to an ethylenic linking is concerned, but not with reference to the effect of a triple bond on the optical rotation.—Methyl ethers of some hydroxyanthraquinones: A. G. **Perkin.**—The colouring matters of the stilbene group, part iv., action of caustic alkalis on *p*-nitrotoluene and its derivatives: A. G. **Green,** A. H. **Davies,** and R. S. **Horsfall.**—The replacement of alkyl radicles by methyl in substituted ammonium compounds: H. O. **Jones** and J. R. **Hill.** The authors find that in amines or quaternary ammonium compounds the ethyl, propyl, *iso*propyl, butyl, *iso*butyl, and *iso*amyl groups are all replaced by methyl, sometimes in the cold, but more easily on heating with methyl iodide.—Note on the formation of abnormal platinichlorides. A correction: A. E. **Dunstan.** The three platinichlorides of the type B_4,H_2PtCl_6, described previously, are now found to belong to a group of such substances already noted by Werner and others.—The nitrates of dimethyl- and methylethyl-thetine menthyl esters: S. **Smiles.** These were prepared by precipitating aqueous solutions of the bromides with aqueous ammonium nitrate.—Synthesis of brazilinic acid and the lactones of dihydrobrazilinic and dihydrohæma-toxylinic acids. Preliminary note: W. H. **Perkin** and R. **Robinson.** Brazilinic acid is formed when trimethyl-brazilin is oxidised by permanganate, and on reduction is converted into the lactone of dihydrobrazilinic acid. Brazilinic acid is produced synthetically by condensing metamethoxyphenoxyacetic ester with *meta*hemipinic anhydride, and must be represented by the following formula (I.):—

I.   II.
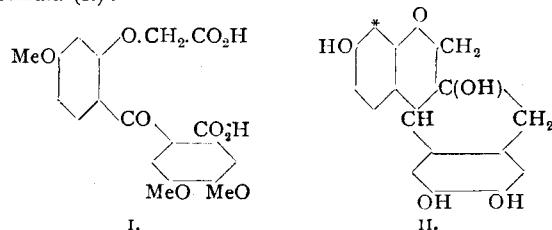
From this and other syntheses it is concluded that brazilin, the colouring matter of Brazil wood, must be represented by the constitutional formula (II.) first assigned to it by Werner and Pfeiffer, and that hæma-toxylin, the colouring matter of logwood, is derived from that of brazilin by the introduction of a hydroxyl group at the point indicated by the asterisk in formula (II.).— Condensations of ketones containing the group

$$CH_2.CO.CH:$$
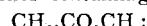
with esters in presence of sodium ethoxide: R. W. L. **Clarke,** A. **Lapworth,** and E. **Wechsler.**—Acylogens and thiocarbamides: A. E. **Dixon** and J. **Taylor.**—The alkyl compounds of gold: W. J. **Pope** and C. S. **Gibson.**—The refractive power of diphenylhexatriene and allied hydrocarbons: Miss I. **Smedley.** The results recorded show that in each case the refractive power of the group increases with the number of unsaturated groups present, and that the influence of the hexatriene structure is always greater than that of the benzene ring.

Royal Anthropological Institute, December 3.—Prof. W. Gowland, ex-president, in the chair.—Some Papuan children's games: Captain F. R. **Barton.** The games dealt with are those played by children in British New Guinea, and included fishing games, cat's cradle, hide and seek, and others. Whilst the games are being played the children sing, and the songs are of particular interest, as in many cases the words are quite archaic, and the meaning has been lost.

CAMBRIDGE.

Philosophical Society, October 28.—Dr. Hobson, president, in the chair.—The longitudinal impact of metal rods with rounded ends (second paper) : J. E. **Sears.** In this paper the effect of the rounded ends is discussed mathematically by means of a combination of the theories of Hertz and St. Venant. Further experimental results are brought forward for purposes of comparison. In these experiments rods of unequal lengths were used, and observations made both of the durations of impact and of the velocities of rebound. The results in nearly every case agreed within 1 per cent. with those given by the theory. Interesting laws are found for the variation in the duration of the impact when the length of *one* of the rods is continuously increased, and also for the case when the velocity of impact is allowed to vary. The paper concludes with a suggestion as to the application of the theory to plane-ended rods, and a calculation of the stresses set up at the ends of the rods during impact.—The fatigue of secondary radiation due to radium rays : J. A. **Crowther.** The object of the experiments was to ascertain if the continuous impact of the radium radiations upon a metal plate over a prolonged period of time produced any alteration in the amount of secondary radiation given out by the plate. Experiments were made both with the β and γ rays, and also with the α rays. The results of the experiments showed (1) that the continuous impact of radium rays upon a metal plate does not cause any diminution in the amount of secondary radiation given out by the metal under the action of the radium rays themselves ; (2) that the continuous impact of radium rays upon a metal plate does produce an alteration in the amount of secondary radiation given out by the plate under the action of Röntgen rays, in amount similar to that produced by the continuous impact of Röntgen rays ; (3) that the continuous action of radium rays produces a very marked diminution in the amount of secondary radiation given out by the plate under the action of ultra-violet light.—Laws of motion : P. V. **Bevan.**—Ionisation by ultra-violet light : Prof. **Thomson.**—The asymptotic approximation to functions defined by highly convergent product forms : J. E. **Littlewood.**

PARIS.

Academy of Sciences, December 9.—M. A. Chauveau in the chair.—An apparatus designed for stars composed partly of gas and partly of solid particles, and capable of giving separately the image of each of the two elements : H. **Deslandres.** A photograph of the star spectrum is made, and from the negative a screen is made with a diaphragm cutting out any desired lines, and this screen is placed in the focal plane of the spectrum. A diagram of the complete apparatus is given, which is arranged so that the spectrum photographed may include either the lines of both gas and solid particles or those of the gas or particles separately. The apparatus is easily applicable to comets, nebulæ, the middle and upper chromosphere of the sun during eclipses, and even the corona.—The supposed poisonous nature of Hungarian beans : L. **Guignard.** Contrary to the results obtained by MM. Evesque, Verdier, and Bretin, the author has not been able to obtain the smallest trace of hydrocyanic acid from Hungarian beans (*Haricots de Hongrie*). The method of estimation of the hydrocyanic acid used by the above-mentioned chemists is subjected to a critical examination, and the author's own method described in detail.—The claims of M. Loeb in the question of experimental parthenogenesis : Yves **Delage.** A reply to some criticisms of M. Loeb on the author's work.—Some Lepidostrobus from the Pyrenees region : R. **Zeiller.** Three illustrations of the fossil are given.—The direct hydrogenation of some aromatic diones : Paul **Sabatier** and A. **Mailhe.** The direct hydrogenation by means of reduced nickel of the aromatic diones gives results corresponding to the ordinary hydrogenation of these ketones, aromatic hydrocarbons being formed. Benzil and benzoin gave symmetrical diphenylethane. Benzoylpropanone gave principally butyl-benzene.—The visibility of Saturn's ring at the present time : J. **Guillaume.** An account of the appearance of the ring on the night of November 23. The results confirm the observations of W. C. Bond and of Secchi.— The Giacobini comet 1907*a* : MM. **Giacobini** and **Javelle.**

Observations of the position of the comet were taken on December 4, 6, and 7. The comet had a stellar appearance of about $15''$ diameter, and showed a nucleus of the fourteenth magnitude.—Observation of the transit of Mercury of November 14 made at the Fabra Observatory at Barcelona : J. Comas **Solá.** The conditions of observation were good. The times of the second, third, and fourth contacts are given. The mean of five observations of the equatorial diameter was $8''\cdot94$, the form of the planet being sensibly circular.—Certain ruled surfaces : M. **Tzitzéica.** —The permutation of the integrals of a system of differential equations : A. **Buhl.**—The function $D(\lambda)$ of Fredholm : T. **Lalesco.**—The systems of partial differential equations leading to (1) the study of the finite deformations of a continuous medium in space of n dimensions ; (2) the determination of the systems of orthogonal curvilinear coordinates with n variables : M. **Riquier.**—General mechanics : Eugène and Francois **Cosserat.**—An electromagnetic compass particularly suitable for armoured blockhouses and submarines : Louis **Dunoyer.** The transmitting compass is placed in a part of the ship where the field gives no trouble, or may be compensated, the readings being transmitted by the arrangement described to the receiver, from which the ship is steered.—The number of free electrons of metals and the electromotive series : V. **Schaffers.**—The condensation of water vapour in the presence of the radium emanation : Mme. **Curie.** Moist air containing the radium emanation always contains a fine fog more or less opaque, and formed of very fine particles. A very much smaller amount of water vapour than that required for saturation is sufficient to produce this phenomenon, but it is not produced when the air is perfectly dry. This effect is quite separate from the known phenomenon of condensation of water vapour by gaseous ions.—The lithium contained in radio-active minerals : Mlle. **Gleditsch.** In view of the observation of Sir William Ramsay that radium transforms copper into lithium, it appeared of interest to see if minerals which contain both copper and radium also contain lithium. In agreement with the result of McCoy (NATURE, November 28), Joachimsthal pitchblende has been found to contain a minute amount of lithium.—Singing flames and tubes with flames of several notes : M. **Athanasiadis.** Experiments are described showing that a manometric flame can produce a perceptible sound, the number of vibrations of which is equal to the number of vibrations of the manometric membrane. A manometric flame can also produce simultaneously two or more notes. —The use of very low temperatures for spectrum analysis and for the study of magneto-optic phenomena in solutions : Jean **Becquerel.**—The propagation of telephone currents through subterranean lines : Henri **Abraham** and M. **Devaux-Charbonnel.** Underground telephone lines are only available for very moderate distances ; the pitch of the notes exercises a considerable influence on the power of transmission to large distances, low voices being better transmitted than high ones, as the line absorbs the high harmonics.—The saturation intensity of magnetisation of iron and nickel : Pierre **Weiss.**—The application of the law of Poiseuille to the measurement of high pressures : A. **Perot.** The volume of water forced through a very fine capillary tube, applying Poiseuille's law, has been used as a basis of a manometer for high pressures, 300 kg. per sq. cm. The accuracy was found to be about 0·5 per cent. —The use of heavy hydrocarbons for lighting : Louis **Denayrouze.**—The action of an incandescent electric conductor on the gases which surround it : M. **Couriot** and Jean **Meunier.** An explanation is put forward of the cause of the non-inflammation of certain explosive mixtures of oxygen and hydrocarbons by means of a wire carried to incandescence by electricity. It is assumed that the wire repels the oxygen molecules and attracts those of the hydrocarbon, so that the actual composition of the gaseous zone immediately round the wire is not in explosive proportions.—The method of limiting densities and its application to the atomic weight of nitrogen : Ph. A. **Guye.** An answer to some criticisms of M. Daniel Berthelot. The author prefers to base his calculations on the idea of corresponding states rather than on that of limiting densities, and compares the two methods in detail as applied to the experimental ratios $N_2O:O$, $N_2O:N_2$, $N_2:O$, $NO:O$, $NO:N$, and $N:O$. These lead to a mean valu-

for the atomic weight of nitrogen of 14·010 instead of the 14·005 of M. Berthelot.—The non-existence of a common solvent for white and red phosphorus: Alb. **Colson.** The author has been unable to dissolve red phosphorus in essence of turpentine, and there seems to be no solvent known which will dissolve both varieties.— The equilibrium of the nickel-bismuth system: A. **Portevin.** The state of equilibrium is only attained for alloys of the pure metals.—An apparatus designed for the production of spark spectra of solutions: A. **de Gramont.** In the apparatus, a drawing of which is given, the spark is produced between two drops of the liquid held up in capillary tubes of fused quartz. The spectra are free from the lines of platinum and silicon.—The identity of graphite and the graphitic carbon set free from castings during tempering: Georges **Charpy.** The experiments described lead to the conclusion, contrary to the views of Forquignon and of Wust and Geiger, that these two forms of carbon are the same.—The action of phosphorus trihydride on mercuric chloride and bromide: P. **Lemoult.**—Carbon monoxide in coal gas: Léo **Vignon.** The larger the amount of oxygen in the coal the larger is the proportion of carbon monoxide and dioxide in the gas obtained from it. At a temperature of 900° C., rather less than one-third of the oxygen of the coal is found in the gas in the form of these two oxides.—The transformation of barbaloin into an isomeric aloin; β-barbaloin and the existence of the latter in several kinds of aloes: E. **Léger.**—The dissociation of combinations of colouring acids to basic colours by adsorbing substances: L. **Pelet-Jolivet.**—Sparteine. The isomerisation of α-methyl-sparteine: Charles **Moureu** and Amand **Valeur.**—The synthesis of symmetrical phenylated anilidophenosafranine: Ph. **Barbier** and P. **Sisley.**—The deposit of evergreen copper: Étienne A. **Ritter.**—The occurrence of granite in the diamond-bearing chimney of De Beers: L. **De Launay.** Some time ago the author predicted that granite would be encountered in a boring at Kimberley at a depth of about 600 metres, and his views have been confirmed by the discovery of granite in this chimney at a depth of 641 metres.—Remarks on the affinities of the Malpighiaceæ of Madagascar, concerning the new genus Tricomariopsis: Marcel **Dubard.**—The variations of dry weight in the higher plants under different luminous intensities: W. **Lubimenko.**—The influence of the hygrometric state of the air on the preservation of seeds: E. **Demoussy.** When the hygrometric state, at 25° C., is above 0·7, many seeds rapidly perish, the seeds of the Cruciferæ being the most resistant.—The inosites from Gui: Georges **Tanret.** —A colour reaction for use with fungi: L. **Arnould** and A. **Goris.**—The fatigue of earth: I. **Pouget** and D. **Chouchak.**—Two hybrids of the peacock and Cochin China fowl: G. **Pays-Mellier** and E. **Trouessart.**— Histolysis of the muscles after the nuptial flight in ants: Charles **Janet.**—The periodic variations of sign of photo-tropism in *Clibanarius misanthropus*: Mlle. Anna **Drzewina.**—The action of the ichthyotoxins on the nervous system of animals immunised against these substances. Contribution to the study of immunity: E. **Gley.**—The favourable influence of small doses of zinc on the vegeta-tion of *Sterigmatocystis nigra*: Maurice **Javillier.**—The presence of phosphorus in the fatty material of micro-organisms: E. **Axilaire.**—The conditions of hydrolysis of the protoplasmids: A. **Etard** and A. **Vila.**—The effects of light on the vision: Jules **Amar.** Excluding pathological conditions, an excess of light puts the eyes into a bad condition for their normal working.—The influence of the illumination round the observer on the acuteness of vision for night signals in navigation: André **Broca** and M. **Polack.**—The presence of yeasts in the fatty bodies of several Coccideæ: A. **Conte** and L. **Gaucheron.**—The trypanolytic property of the serum in experimental nagana: A. **Ridet** and G. **Vallet.**—The pathogeny of glaucoma: A. **Terson.**—The death of infants by the thymus and in chloroform anæsthesia. Anatomical, physiological, and clinical study: R. **Robinson.**—The action of chlorine on the tubercle bacillus: MM. **Moussu** and **Goupil.**—The presence of the Trias in the mountains of Gigondas (Vaucluse), and the phenomena of *charriage* which are observed in this *massif*: L. **Joleaud.**—The Neocretaceen of Argolide: Ph. **Négris** and Const. A. **Ktenas.**—The

discovery of vertebrates in the Oligocene of Fronsadais, basin of the Gironde: G. **Vasseur.**—Some new fossil plants in the Sparnacean of the Paris region: P. H. **Fritel.**—Study of a specimen taken from the sea bottom of the Channel near the coast: J. **Thoulet.**

CALCUTTA.

Asiatic Society of Bengal, November 6.—Note on the common English merlin (*Æsalon regulus*) and its train-ing: Lieut.-Colonel D. C. **Phillott.**—A case of lateral floral proliferation of the inflorescence of the pine-apple—*Ananas sativus*, Schult. f.: Captain A. T. **Gage.** De-scriptions with figures of a pine-apple surrounded by many small elongated pine-apples after the manner of a hen-and-chickens daisy.

DIARY OF SOCIETIES.

THURSDAY, DECEMBER 19.

CHEMICAL SOCIETY, at 8.30.—Derivatives of Tetramethyl Glucose: J. C. Irvine and A. M. Moodie.—The Characterisation of Mercerised Cotton; β—N---β
Preliminary Note: J. Hübner.—Attempted Synthesis of | Di-β—CH—β
naphthacridine; Condensation of Methylene Dichloride and 1-Substi-tuted-2-Naphthylamines: A. Senier and P. C. Austin.
LINNEAN SOCIETY, at 8.—On Mendelism and Sex: Dr. Archdall Reid.
INSTITUTION OF MINING AND METALLURGY, at 8.
INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electrical Power in Railway Goods Warehouses: H. Henderson.

FRIDAY, DECEMBER 20.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Mechanical and Thermal Efficiency of a Petrol Engine: L. G. E. Morse.
INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Notes on the Manu-facture and Upkeep of Milling Cutters: Dr. H. T. Ashton.

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